CalPERS' Actuarial and Retirement Benefits Seminar

- Rate Volatility
- Rate Stabilization
- Preview 2006-07 Rates
- Pooling
- GASB 45

Rate Stabilization

Example

- To See How Rate Stabilization Works, We Will Consider a Numerical Example
- We Start With a Hypothetical Miscellaneous Plan With $1 Million In Assets at June 30, 1994
- We Will See How 6 Good Years Of Asset Earnings Followed By 3 Bad Years Causes the Contribution Rate to Go Down and then Back Up

Example

- First We Will Use Assets Equal to Market Value, Without Any Smoothing
- Next We Will Use the New Asset Smoothing Method Adopted by the CalPERS Board In April 2005, and
- Finally We Will Use the Old Asset Smoothing Method

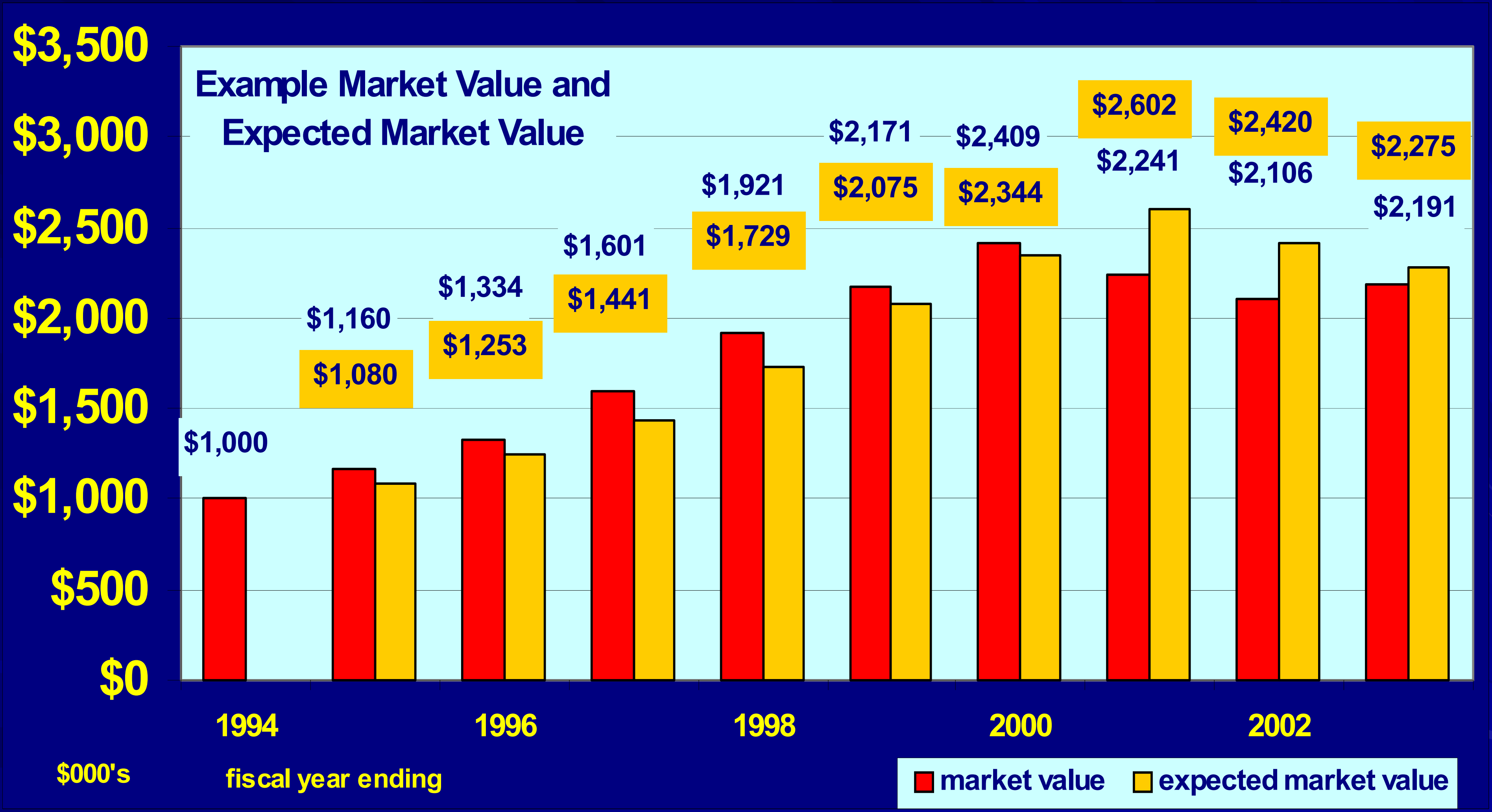
Note:

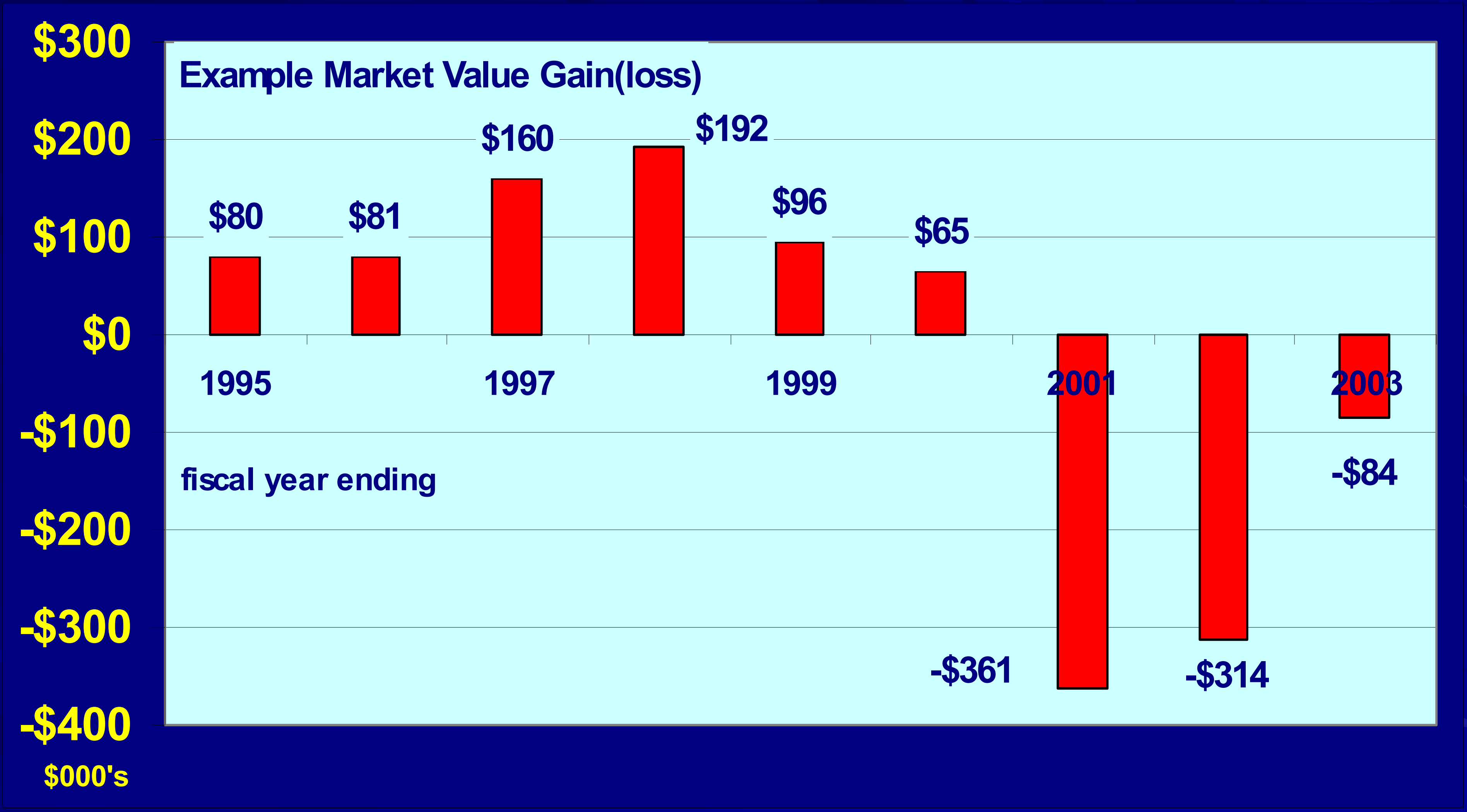
- In Order to Make the Calculations in the Example That Follows as Understandable as Possible, We Have Ignored The Two Year Lag Between Valuation Date and “Rate Year”.
- If We Did Not Do This, the New Gain(Loss) Amortization Base as of the Valuation Date Would Need to be “Rolled Forward” Two Years With Contributions and Interest Before the Amortization Payment Could Determined.
- The Relative Magnitude of the Results is Not Changed by Ignoring the Roll Forward for Simplicity

Amortization Base

- Contribution =
  Normal Cost +
  Amortization Of Unfunded
- Each Year A New Amortization Base Is Added To The Unfunded
- New Base Is:
  Assets – “Expected” Assets (First Case, Market Value)


Example Market Value
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
$1,000
$1,160
$1,334
$1,601
$1,921
$2,171
$2,409
$2,241
$2,106
$2,191
1994
1996
1998
2000
2002
$000's
fiscal year ending


Example Market Value and
Expected Market Value
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
$1,000
$1,160
$1,080
$1,334
$1,253
$1,601
$1,441
$1,921
$1,729
$2,171
$2,075
$2,409
$2,344
$2,602
$2,241
$2,420
$2,106
$2,275
$2,191
1994
1996
1998
2000
2002
$000's
fiscal year ending
market value
expected market value

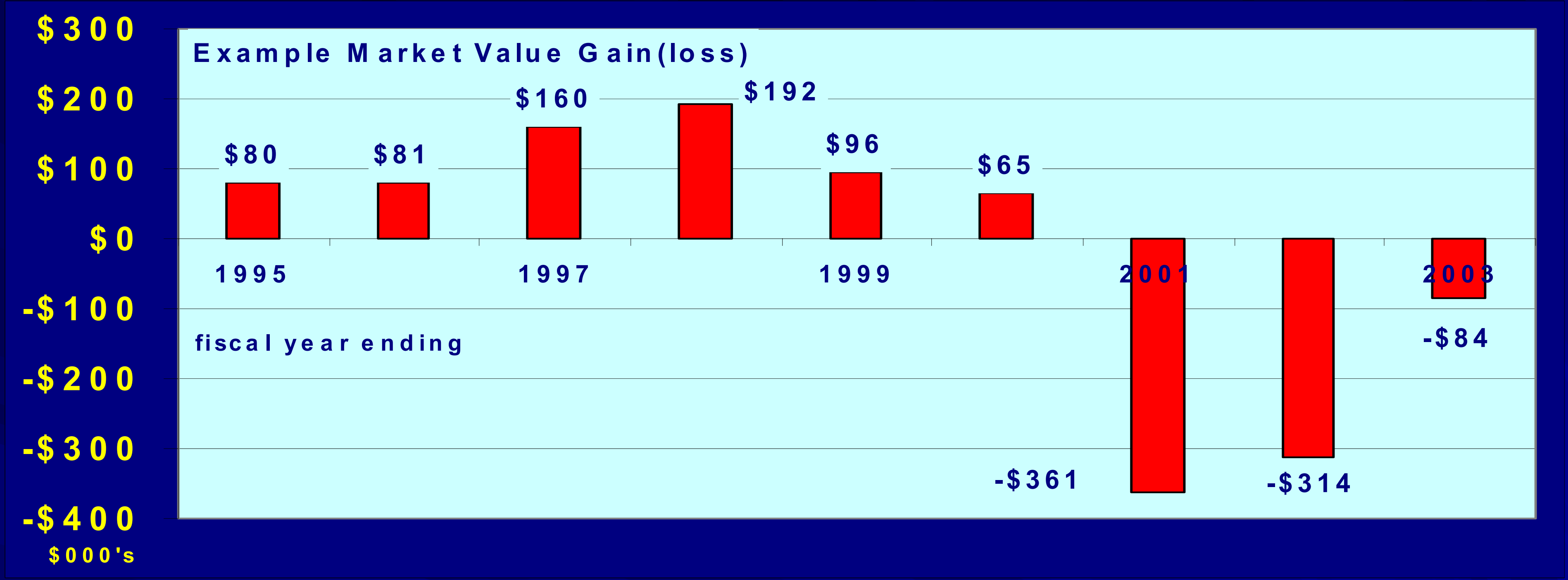

Example Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
$80
$81
$160
$192
$96
$65
-$361
-$314
-$84
1995
1997
1999
2001
2003
fiscal year ending

Amortization Payment

- The "Payment" on the Market Value Gain(Loss) Base is 10%* of the Total
- The Payment on a Gain is a Decrease to the Contribution Rate and on a Loss is an Increase
- The Payment Divided By Payroll** Equals the Rate

*Beginning July 1, 2005, the new rate stabilization policy requires a rolling 30-yr amortization. The new payment is equal to 6% of the total, instead of 10%

** Payroll is assumed to increase 3% per year for simplicity (actual CalPERS assumption is 3.25%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$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
$80
$81
$160
$192
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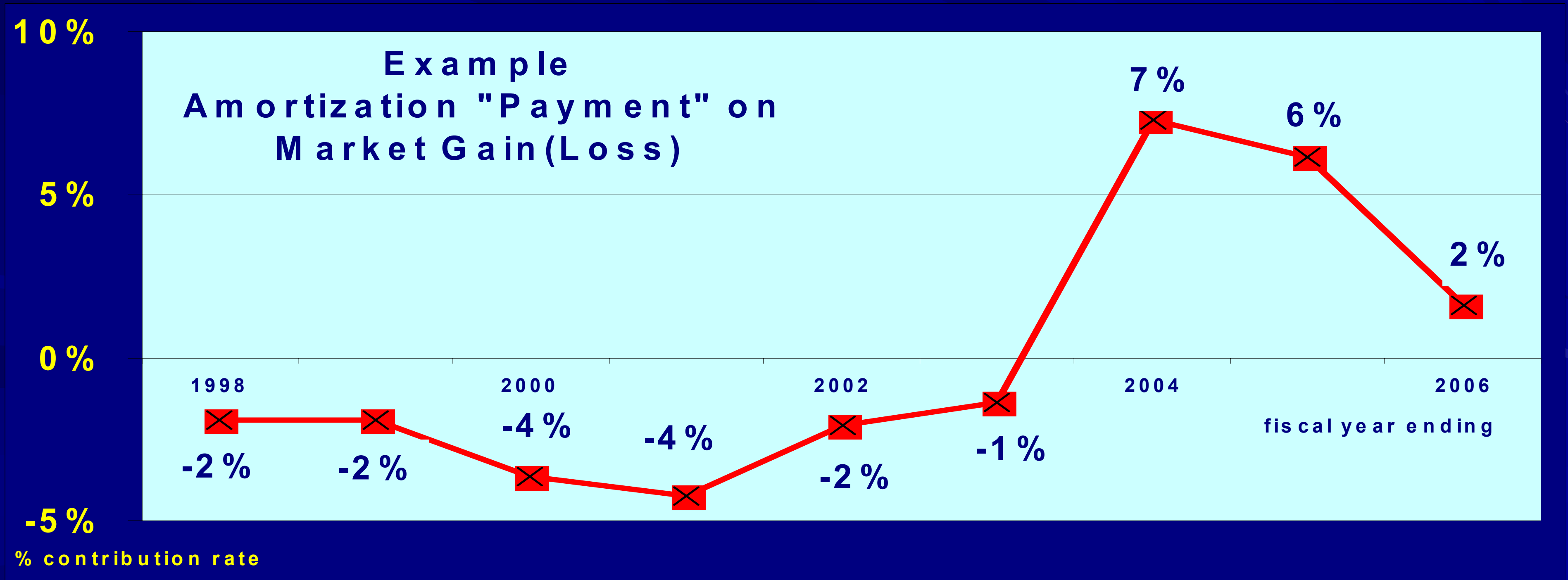
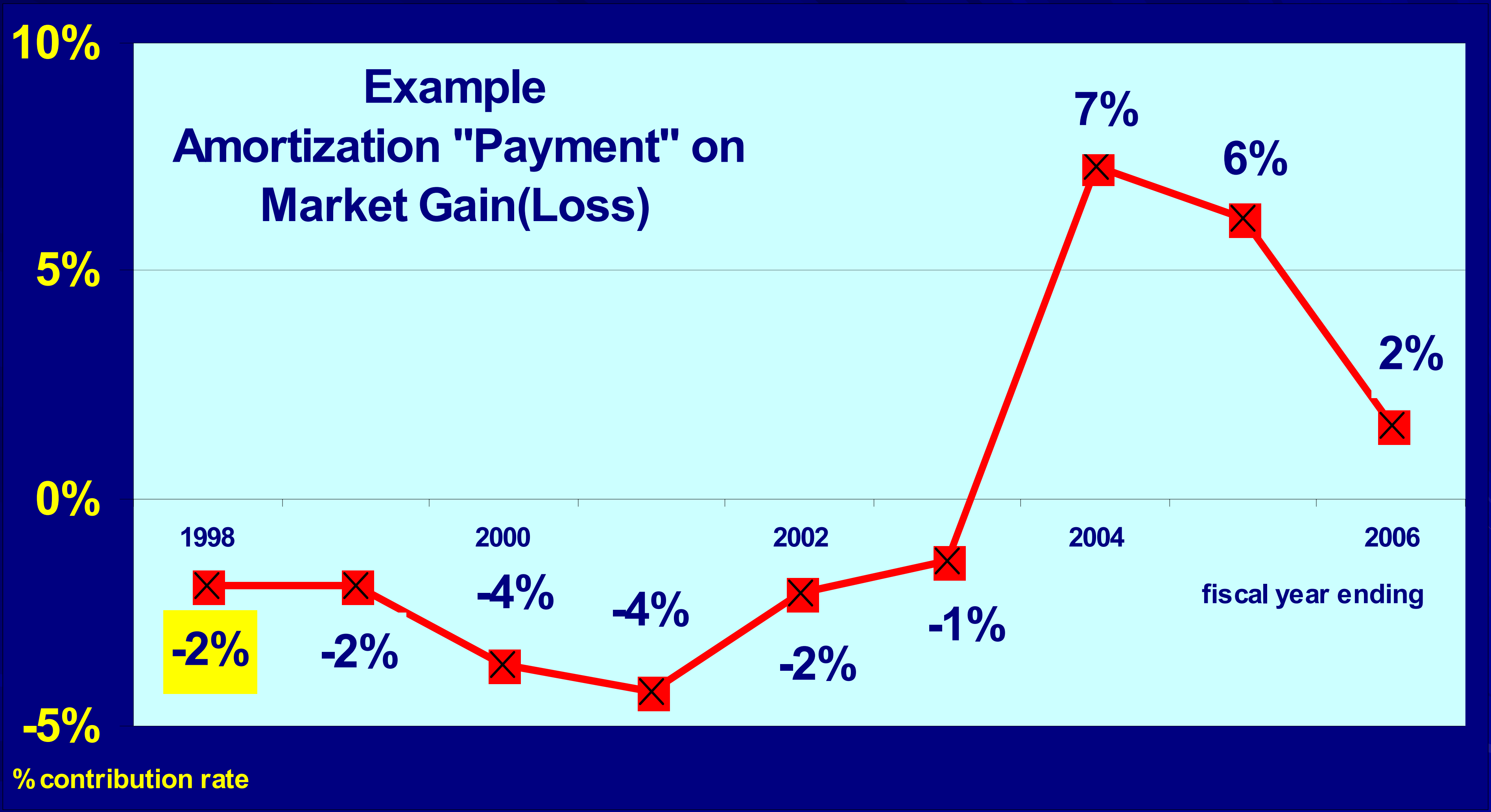
1995
1997
1999
2001
2003
fiscal year ending


Example
Amortization "Payment" on
Market Gain(Loss)
10%
5%
0%
-5%
% contribution rate
-2%
-2%
-4%
-4%
-2%
-1%
7%
6%
2%
1998
2000
2002
2004
2006
fiscal year ending


10%
5%
0%
-5%
% contribution rate
Example
Amortization "Payment" on
Market Gain(Loss)
1998
2000
2002
2004
2006
fiscal year ending
-2%
-2%
-4%
-4%
-2%
-1%
7%
6%
2%

market earnings fye valuation date	16%
valuation date / rate year	6/30/1995 1997-98
	$ 000's
	market
beginning of year	$ 1,000
end of year expected values	$ 1,080
actual end of year market value	$ 1,160
difference between market and expected actuarial	
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial	
end of year preliminary actuarial value =expected + adjustment	
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial	
gain or (loss) = actual - expected	$ 80
portion of market gain unrecognized	
amortization = 6% for (new) actuarial, 10% for old actuarial and market	$ (8)
payroll = 3% increase each year	$ 416
(gain) or loss % = amortization / payroll	-2%

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		$ 000's	
		market	
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portion of market gain unrecognized			
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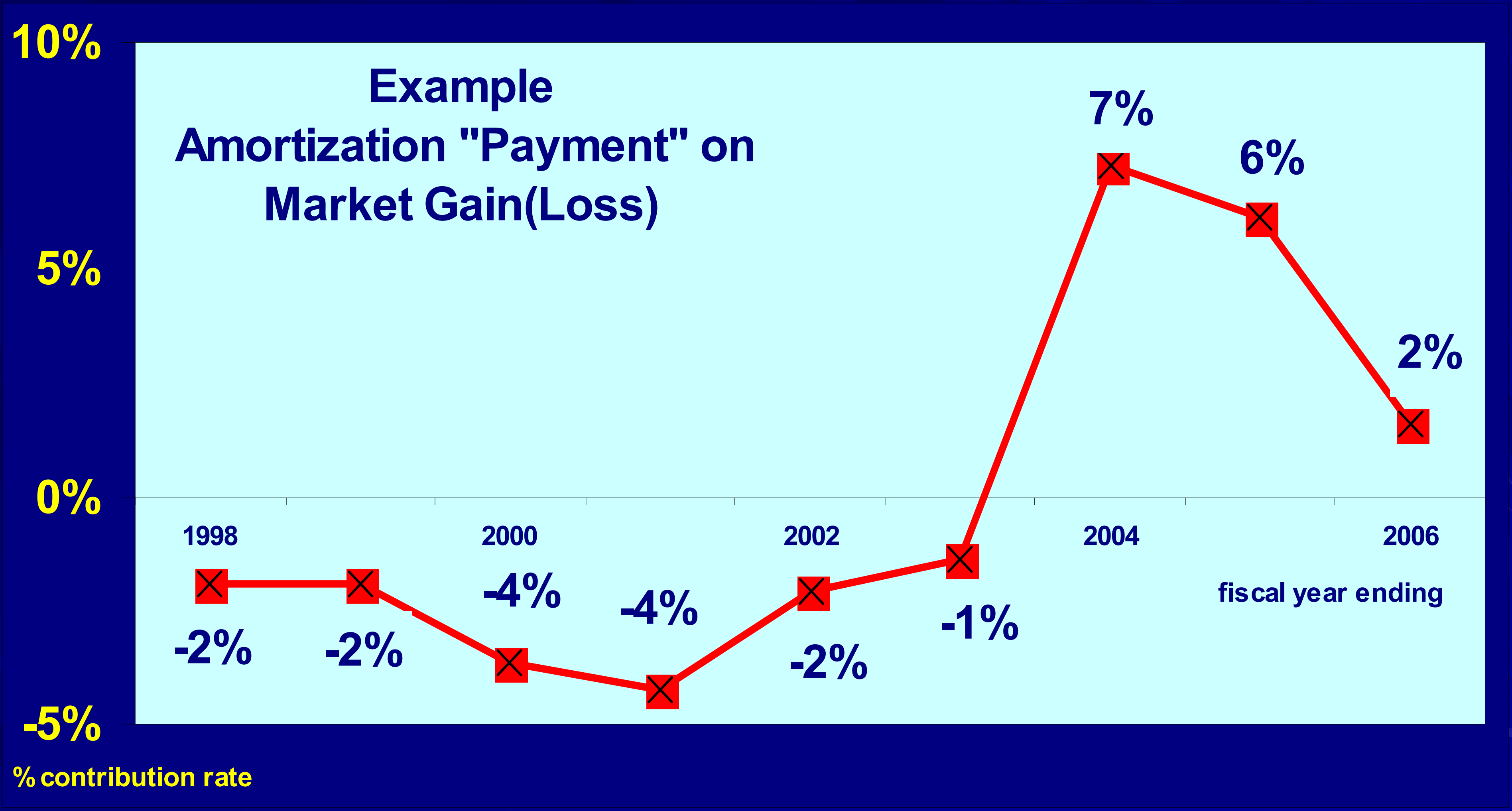
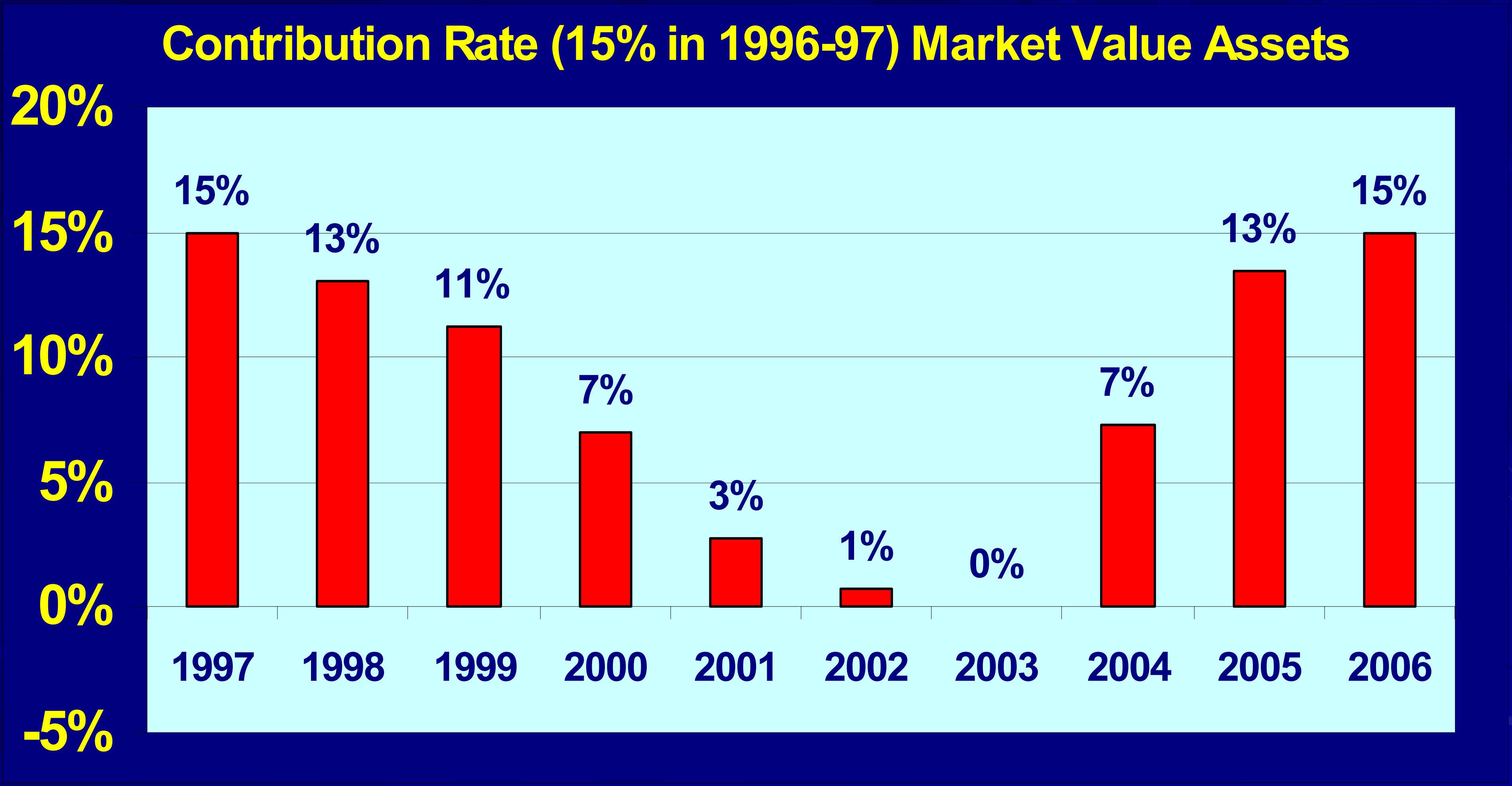
market earnings fye valuation date		16%		
valuation date / rate year		6/30/1995 1997-98		
		$ 000's		
		market		
beginning of year		$	1,000	
end of year expected values		$	1,080	
actual end of year market value		$	1,160	
difference between market and expected actuarial				
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial				
end of year preliminary actuarial value =expected + adjustment				
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial				
gain or (loss) = actual - expected		$	80	
portion of market gain unrecognized				
amortization = 6% for (new) actuarial, 10% for old actuarial and market		$	(8)	
payroll = 3% increase each year		$	416	
(gain) or loss % = amortization / payroll			-2%	


Example
Amortization "Payment" on
Market Gain(Loss)
10%
5%
0%
-5%
% contribution rate
1998
2000
2002
2004
2006
fiscal year ending
-2%
-2%
-4%
-4%
-2%
-1%
7%
6%
2%


Contribution Rate (15% in 1996-97) Market Value Assets
20%
15%
10%
5%
0%
-5%
15%
13%
11%
7%
3%
1%
0%
7%
13%
15%
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006

- CalPERS' Board Adopted the New Rate Stabilization Policy at its April 2005 Meeting
  - New Asset Smoothing Method and Amortization Payment
  - New Minimum Contribution

New Asset Smoothing Method and Amortization Payment

- Since the Primary Cause of Contribution Rate Volatility is Asset Volatility
- In Order to Smooth the Contributions, We Smooth the Assets
- The Smoothed Asset Value is Called the "Actuarial Value of Assets"

New Asset Smoothing Method and Amortization Payment

- The Smoothest Value of Assets Would be One That Earns Exactly the Assumed Rate of 8% Each Year
- The New Method Calculates the Expected Actuarial Value Each Year With 8% Earnings, and Then Adds or Subtracts an "Adjustment"
- To the Extent that the Adjustment is "Small" the New Method Produces a Smooth Actuarial Value of Assets

Actuarial Value Of Assets

- Compare Expected Actuarial Value to Market Value,
- Adjust Expected Actuarial Value by 1/15 of the Difference, and
- Limit Final Actuarial Value to the Corridor of 80%-120% of Market

Amortization Payment

- Rolling 30-year Level Percent of Pay, Approximately 6% of Total
- Complies with GASB 27

valuation date / rate year	6/30/1995 1997-98		
	$ 000's		
	market	new actuarial	ratio
beginning of year	$ 1,000	$ 1,000	100%
end of year expected values	$ 1,080	$ 1,080	
actual end of year market value	$ 1,160		
difference between market and expected actuarial		$ 80	
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial		$ 5	
end of year preliminary actuarial value =expected + adjustment		$ 1,085	94%
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial		$ 1,085	94%
gain or (loss) = actual - expected	$ 80	$ 5	
portion of market gain unrecognized		$ 75	
amortization = 6% for (new) actuarial, 10% for old actuarial and market	$ (8)	$ (0)	
payroll = 3% increase each year	$ 416	$ 416	
(gain) or loss % = amortization / payroll	-2%	0%	

valuation date / rate year		6/30/1995 1997-98		
		$ 000's		
		market	new actuarial	ratio
beginning of year		$ 1,000	$ 1,000	100%
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	$ 000's		
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	$ 000's		
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	$ 000's		
	market	new actuarial	ratio
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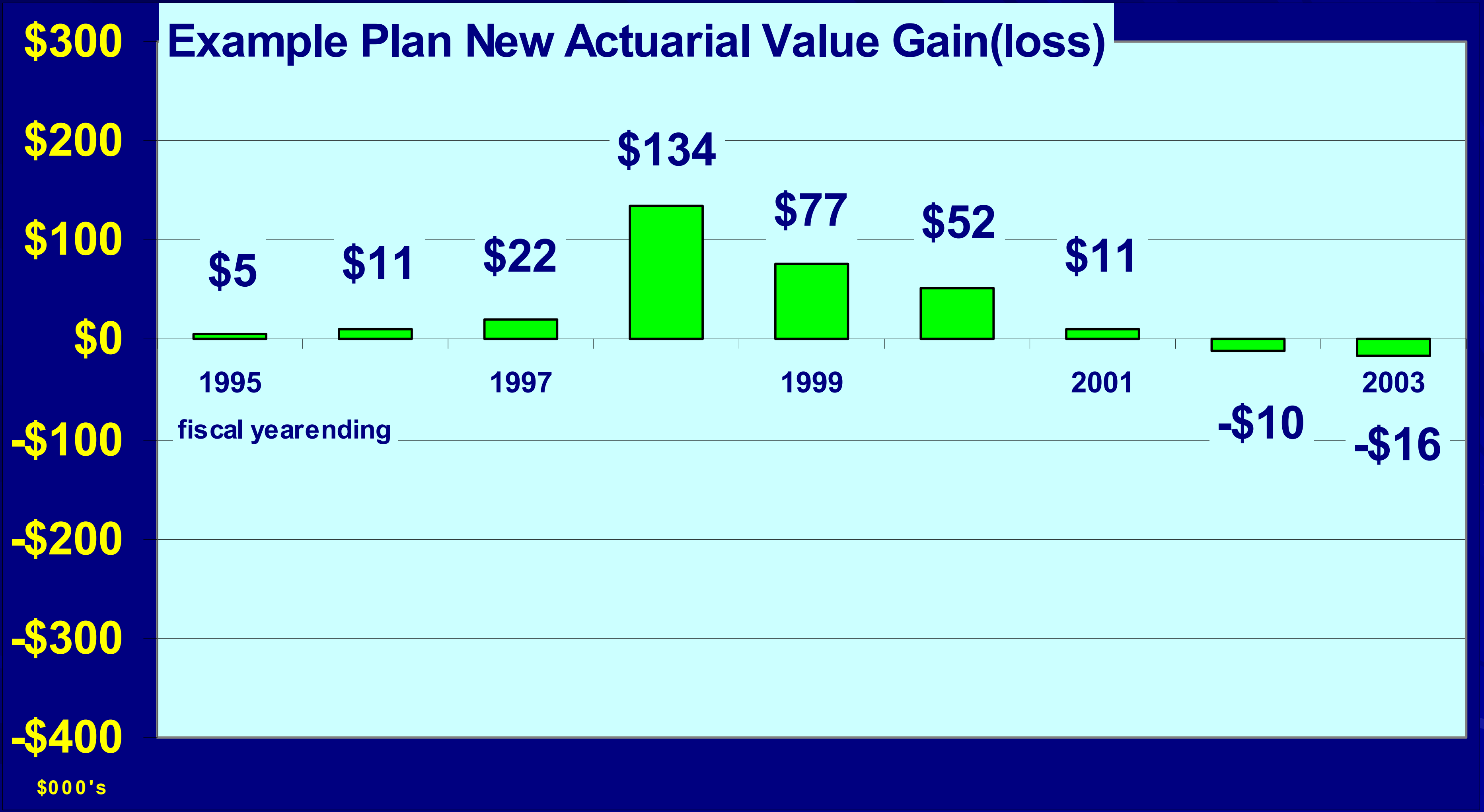
payroll = 3% increase each year	$ 416	$ 416	
(gain) or loss % = amortization / payroll	-2%	0%	

- **Notice that the Small “Adjustment” of $5 is the Difference Between the Final Actuarial Value and the “Expected” Actuarial Value, Hence the Adjustment Is Precisely Equal to the “Gain” that is “Recognized” on the Actuarial Value of Assets**
- **The Remaining $75 of the $80 Market Value Gain is “Unrecognized”**



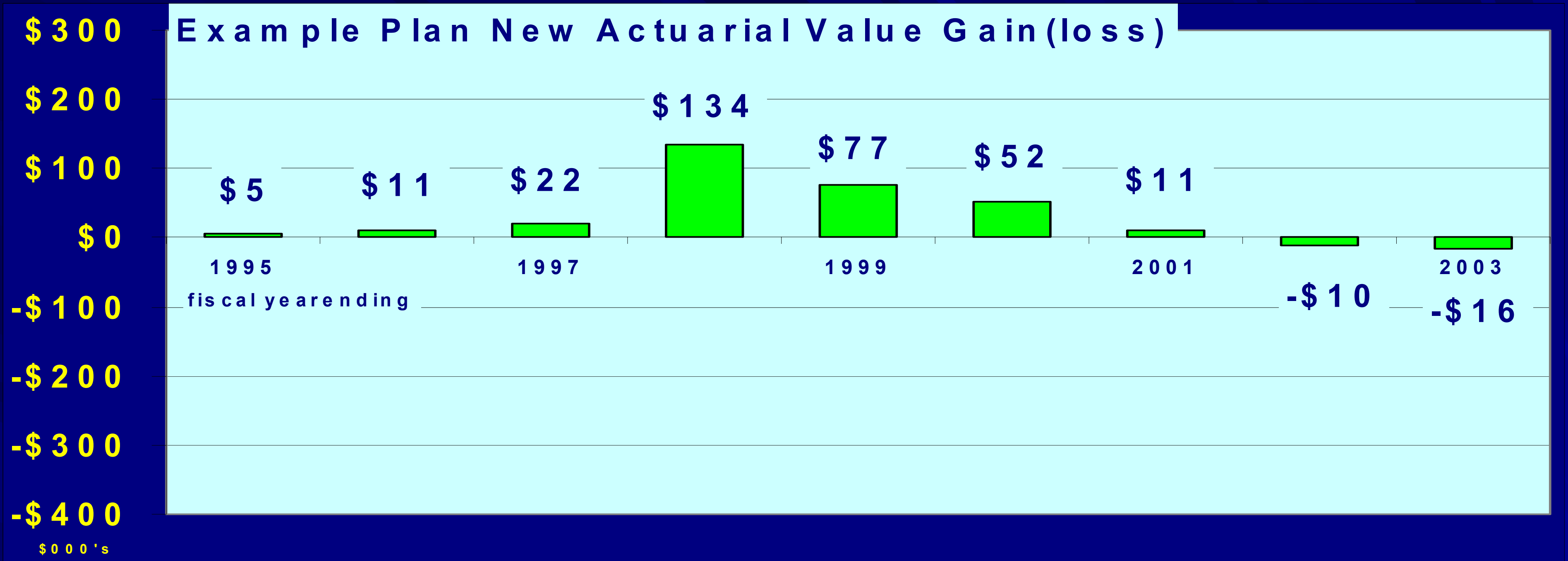
Example Plan New Actuarial Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
$5
$11
$22
$134
$77
$52
$11
-$10
-$16
1995
1997
1999
2001
2003
fiscal yearending

Amortization Payment

- The New "Payment" on the New Actuarial Value Gain(Loss) Base is 6%* of the Total
- The Payment on a Gain is a Decrease to the Contribution Rate and on a Loss is an Increase
- The Payment Divided By Payroll** Equals the Rate

*Before July 1, 2005, the payment was 10% of the total

Payroll is assumed to increase 3% per year for simplicity (actual CalPERS assumption is 3.25%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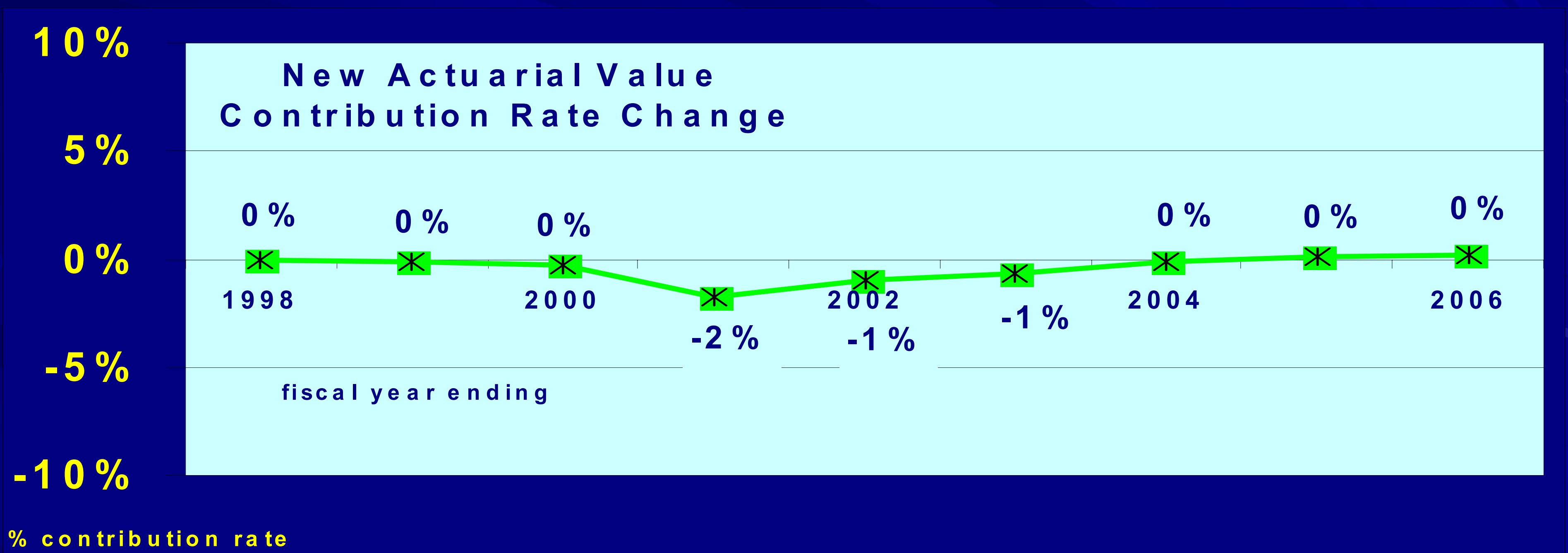
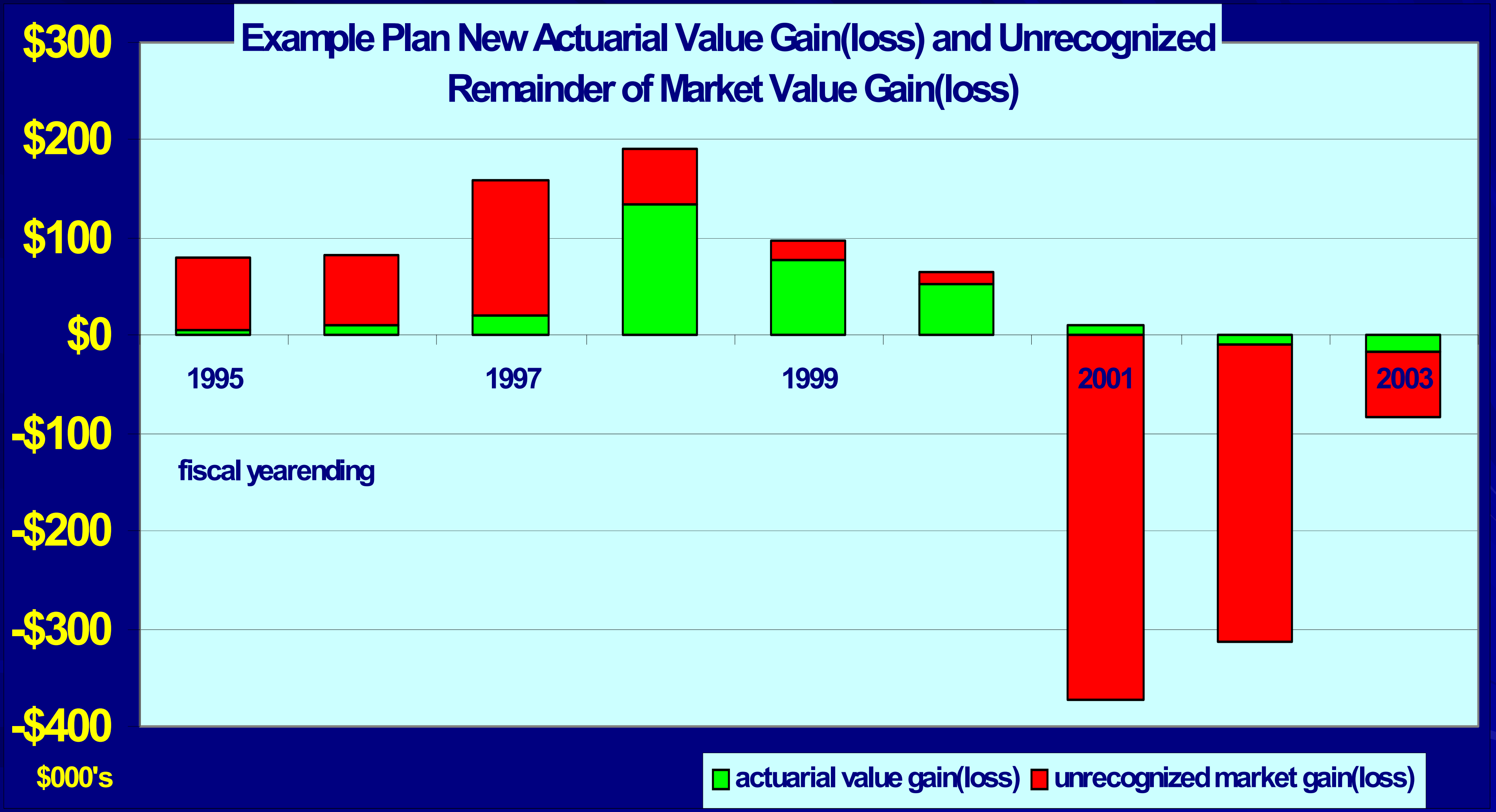
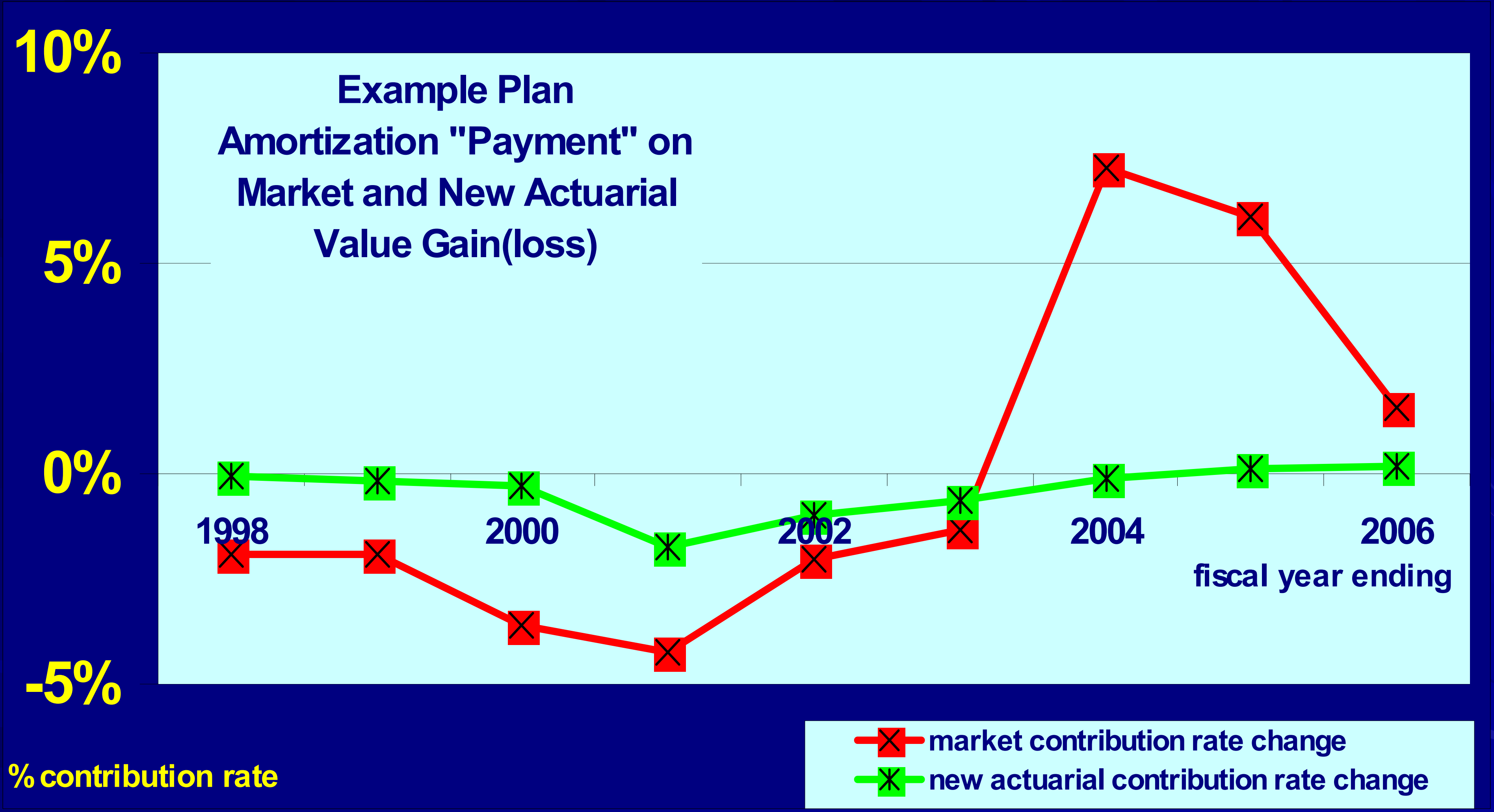
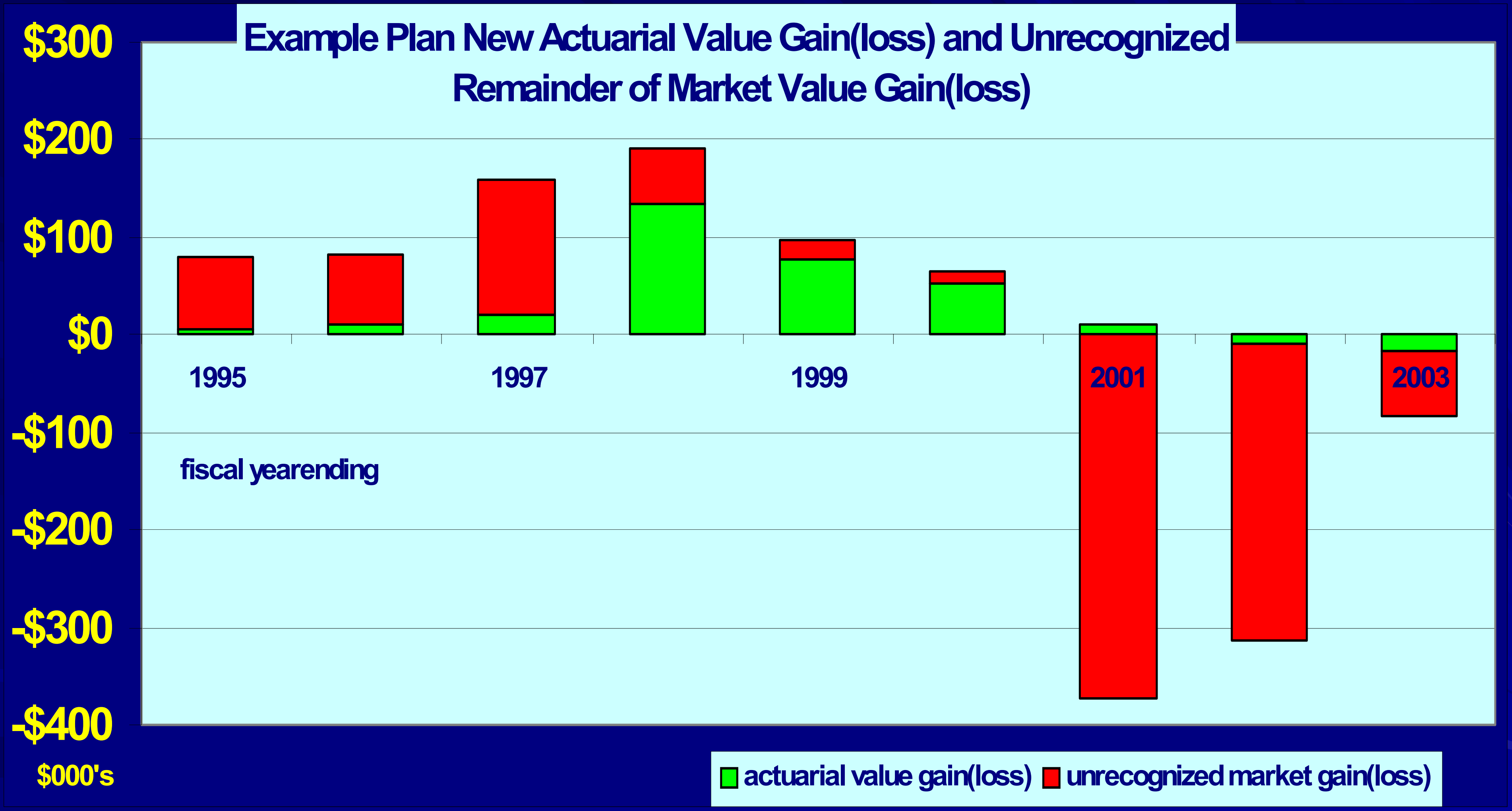
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
$5
$11
$22
$134
$77
$52
$11
-$10
-$16
1995
1997
1999
2001
2003
fiscal year ending


New Actuarial Value
Contribution Rate Change
10%
5%
0%
-5%
-10%
% contribution rate
0%
0%
0%
-2%
-1%
-1%
0%
0%
0%
1998
2000
2002
2004
2006
fiscal year ending


Example Plan New Actuarial Value Gain(loss) and Unrecognized Remainder of Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
1995
1997
1999
2001
2003
fiscal yearending
actuarial value gain(loss)
unrecognized market gain(loss)



10%
5%
0%
-5%
Example Plan
Amortization "Payment" on
Market and New Actuarial
Value Gain(loss)
1998
2000
2002
2004
2006
fiscal year ending
market contribution rate change
new actuarial contribution rate change
% contribution rate


Example Plan New Actuarial Value Gain(loss) and Unrecognized Remainder of Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
1995
1997
1999
2001
2003
fiscal yearending
actuarial value gain(loss)
unrecognized market gain(loss)

- In the Fourth Year, the Amount Recognized Under the New Smoothing Method Increases Sharply
- Lets Look at Why This Happened

market earnings fye valuation date	20%		
valuation date / rate year	6/30/1998 2000-01		
	$ 000's		
	market	new actuarial	ratio
beginning of year	$ 1,601	$ 1,299	81%
end of year expected values	$ 1,729	$ 1,403	
actual end of year market value	$ 1,921		
difference between market and expected actuarial		$ 518	
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial		$ 35	
end of year preliminary actuarial value =expected + adjustment		$ 1,438	75%
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial		$ 1,537	80%
gain or (loss) = actual - expected	$ 192	$ 134	
portion of market gain unrecognized		$ 58	
amortization = 6% for (new) actuarial, 10% for old actuarial and market	$ (19)	$ (8)	
payroll = 3% increase each year	$ 455	$ 455	
(gain) or loss % = amortization / payroll	-4%	-2%	

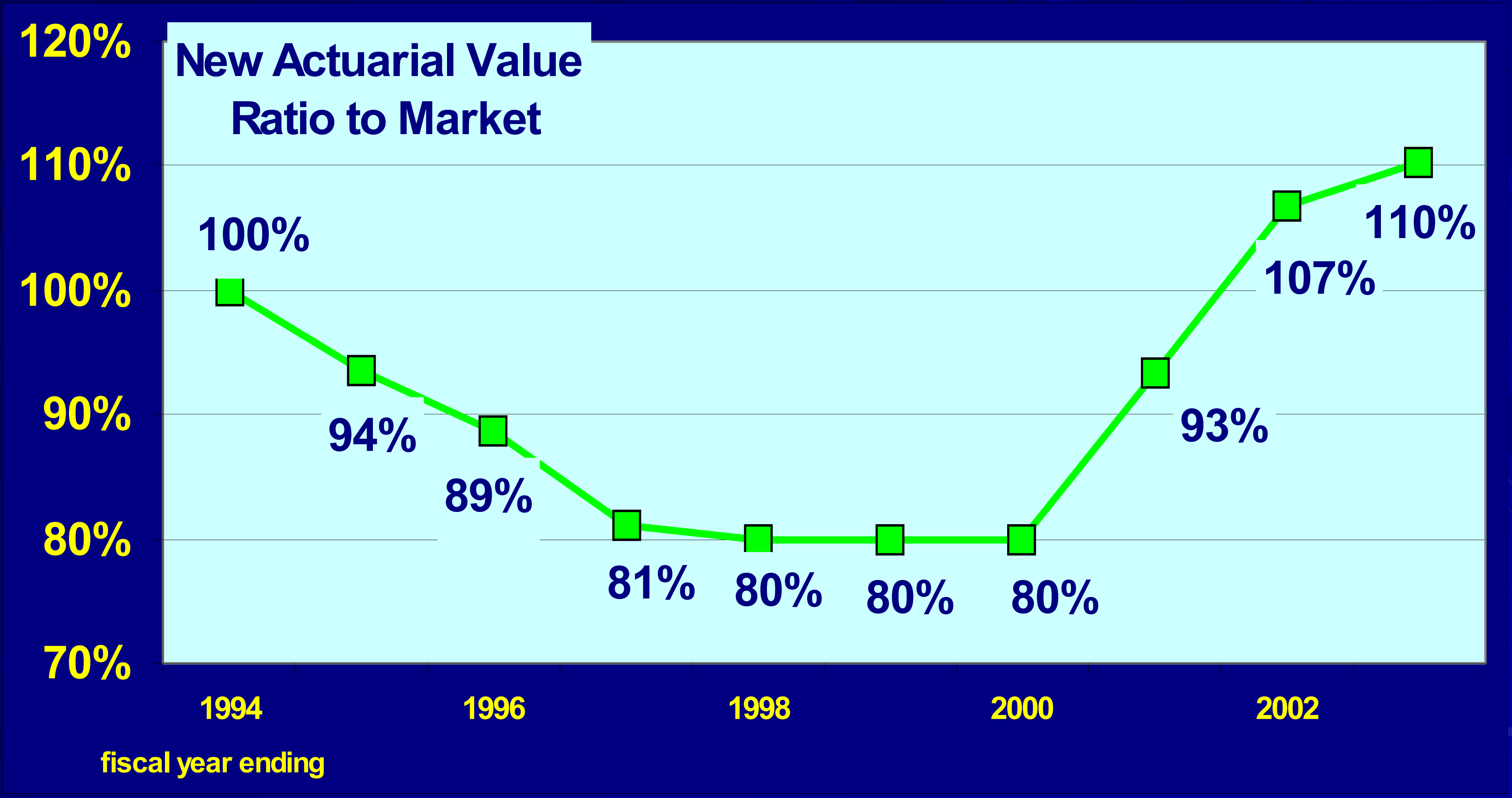
market earnings fye valuation date		20%		
valuation date / rate year		6/30/1998 2000-01		
		$ 000's		
		market	new actuarial	ratio
beginning of year		$ 1,601	$ 1,299	81%
end of year expected values		$ 1,729	$ 1,403	
actual end of year market value		$ 1,921		
difference between market and expected actuarial			$ 518	
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial			$ 35	
end of year preliminary actuarial value =expected + adjustment			$ 1,438	75%
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial			$ 1,537	80%
gain or (loss) = actual - expected		$ 192	$ 134	
portion of market gain unrecognized			$ 58	
amortization = 6% for (new) actuarial, 10% for old actuarial and market		$ (19)	$ (8)	
payroll = 3% increase each year		$ 455	$ 455	
(gain) or loss % = amortization / payroll		-4%	-2%	

market earnings fye valuation date		20%		
valuation date / rate year		6/30/1998 2000-01		
		$ 000's		
		market	new actuarial	ratio
beginning of year		$ 1,601	$ 1,299	81%
end of year expected values		$ 1,729	$ 1,403	
actual end of year market value		$ 1,921		
difference between market and expected actuarial			$ 518	
adjustment =1/15 of difference for new actuarial, =1/3 for old actuarial			$ 35	
end of year preliminary actuarial value =expected + adjustment			$ 1,438	75%
end of year actuarial value limited to 80%-120% corridor new actuarial, 90%-110% old actuarial			$ 1,537	80%
gain or (loss) = actual - expected		$ 192	$ 134	
portion of market gain unrecognized			$ 58	
amortization = 6% for (new) actuarial, 10% for old actuarial and market		$ (19)	$ (8)	
payroll = 3% increase each year		$ 455	$ 455	
(gain) or loss % = amortization / payroll		-4%	-2%	

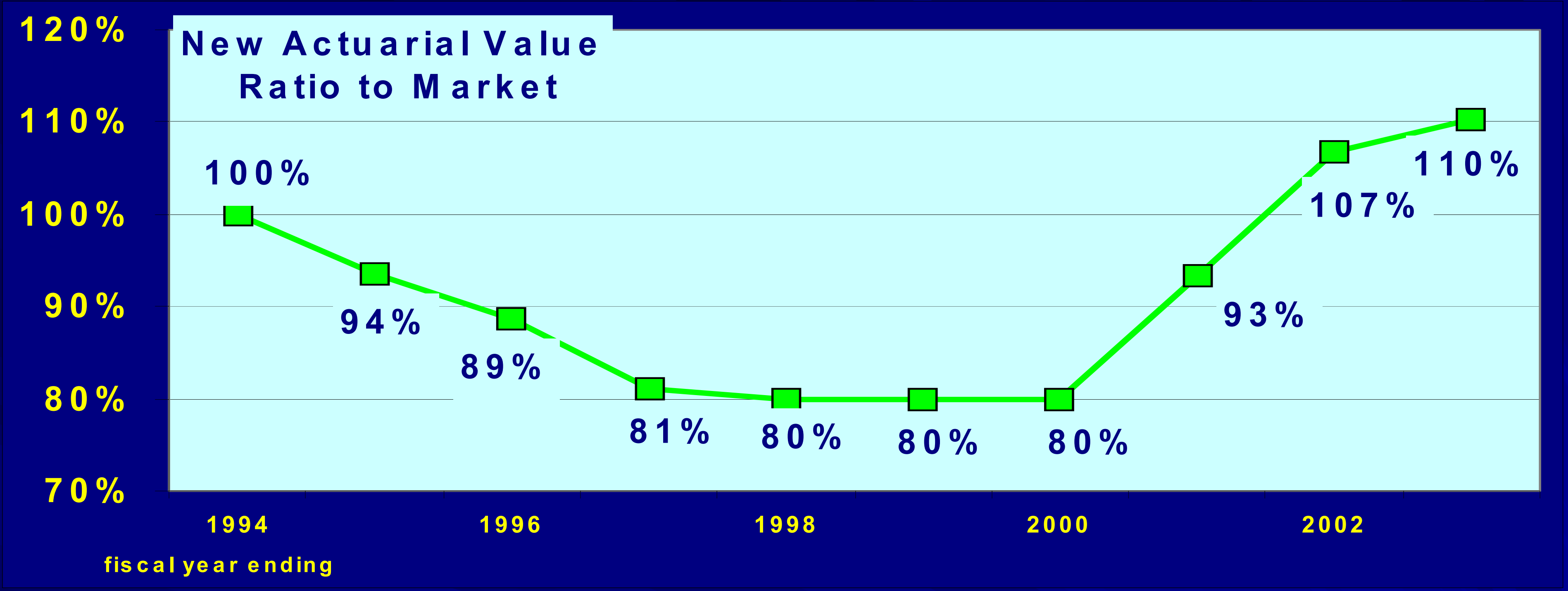
- At the End of the Fourth Straight Year of Double Digit Market Earnings, the Actuarial Value of Assets Falls Below the 80% Corridor
- Bringing the Value Back Up to 80% Makes the Gain = $134 Which is Much Greater than the Original $35 “Adjustment”

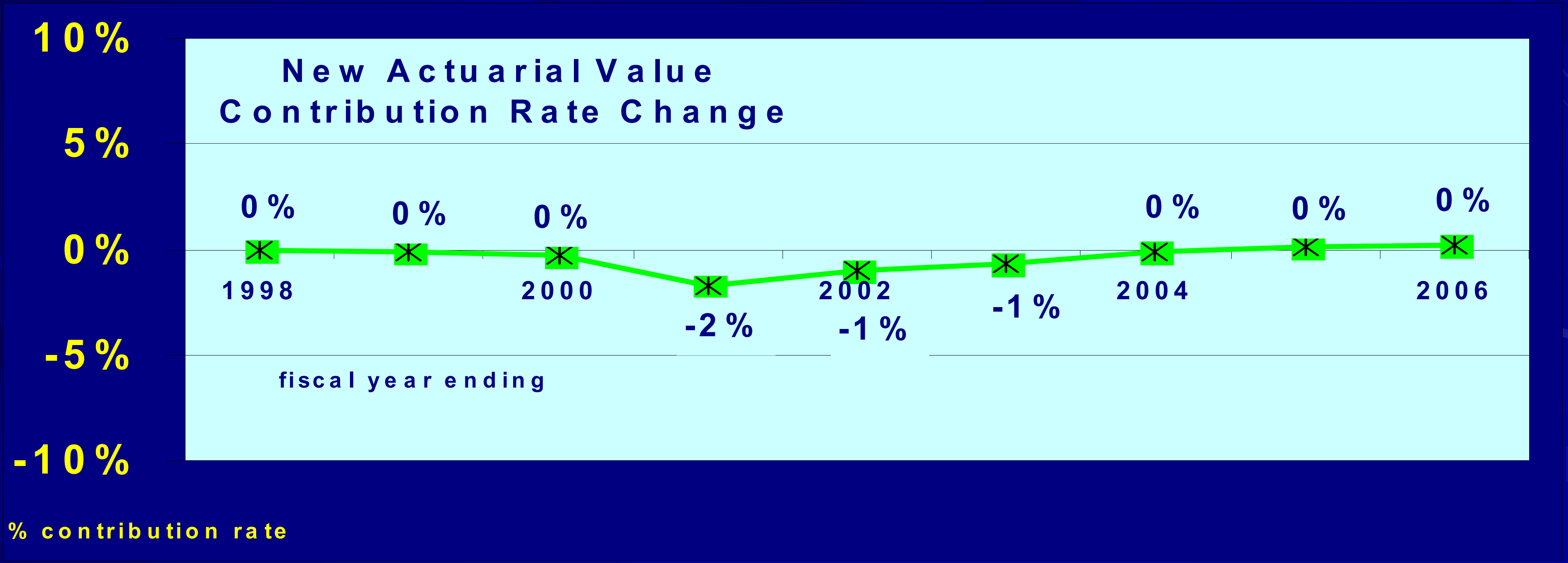
New Asset Smoothing Method

- The New Actuarial Value of Assets "Recognizes" A Portion of the Market Gain(Loss) and Leaves the Remainder of it "Unrecognized"
- The Recognized Portion is Relatively Small (1/15) Except When the Actuarial Value is Limited by the 80% or 120% Corridor



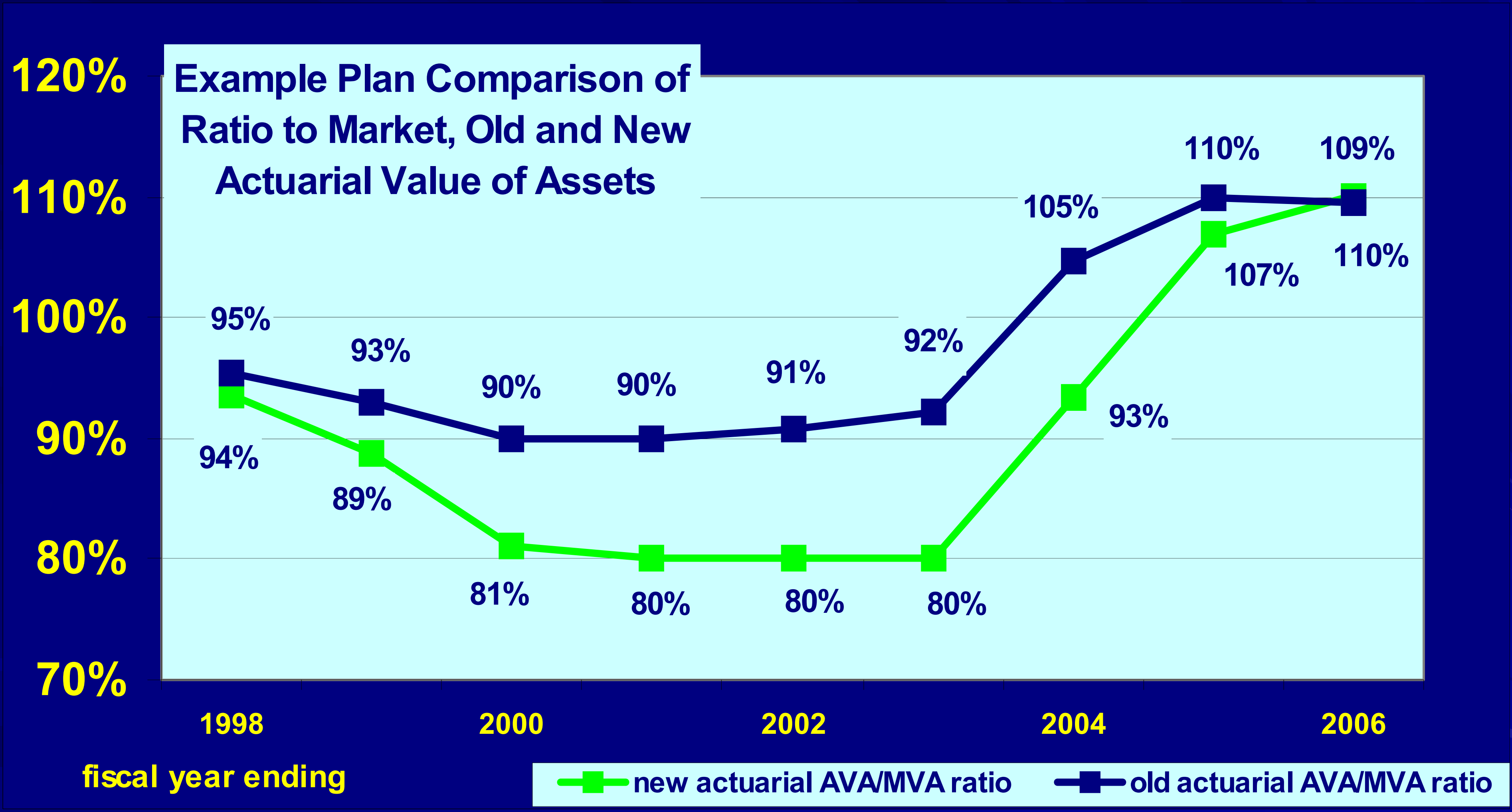
New Actuarial Value
Ratio to Market
120%
110%
100%
90%
80%
70%
100%
94%
89%
81%
80%
80%
80%
93%
107%
110%
1994
1996
1998
2000
2002
fiscal year ending


New Actuarial Value
Ratio to Market
120%
110%
100%
90%
80%
70%
100%
94%
89%
81%
80%
80%
80%
93%
107%
110%
1994
1996
1998
2000
2002
fiscal year ending

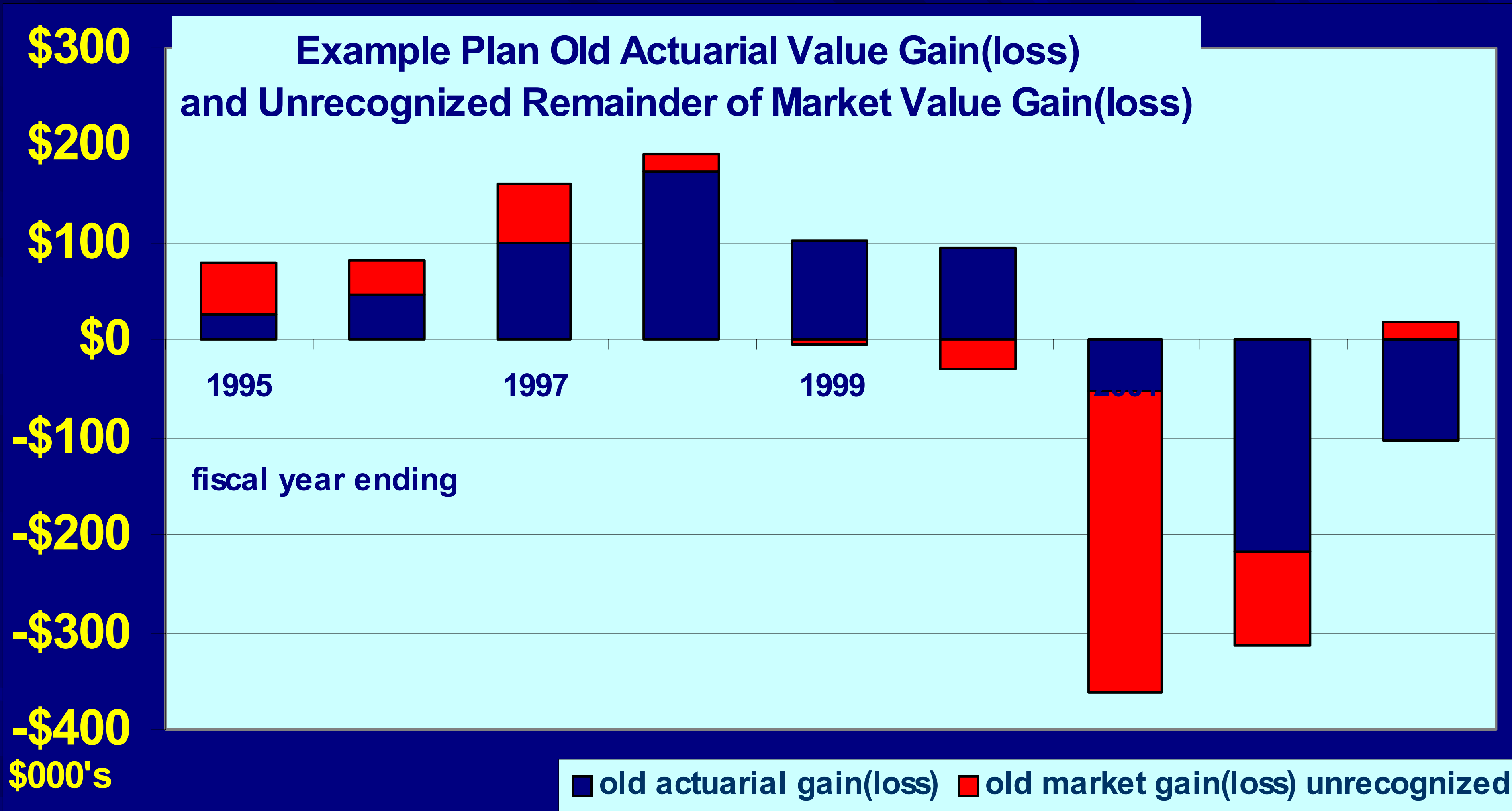

New Actuarial Value
Contribution Rate Change
10%
5%
0%
-5%
-10%
0%
0%
0%
-2%
-1%
-1%
0%
0%
0%
1998
2000
2002
2004
2006
fiscal year ending
% contribution rate

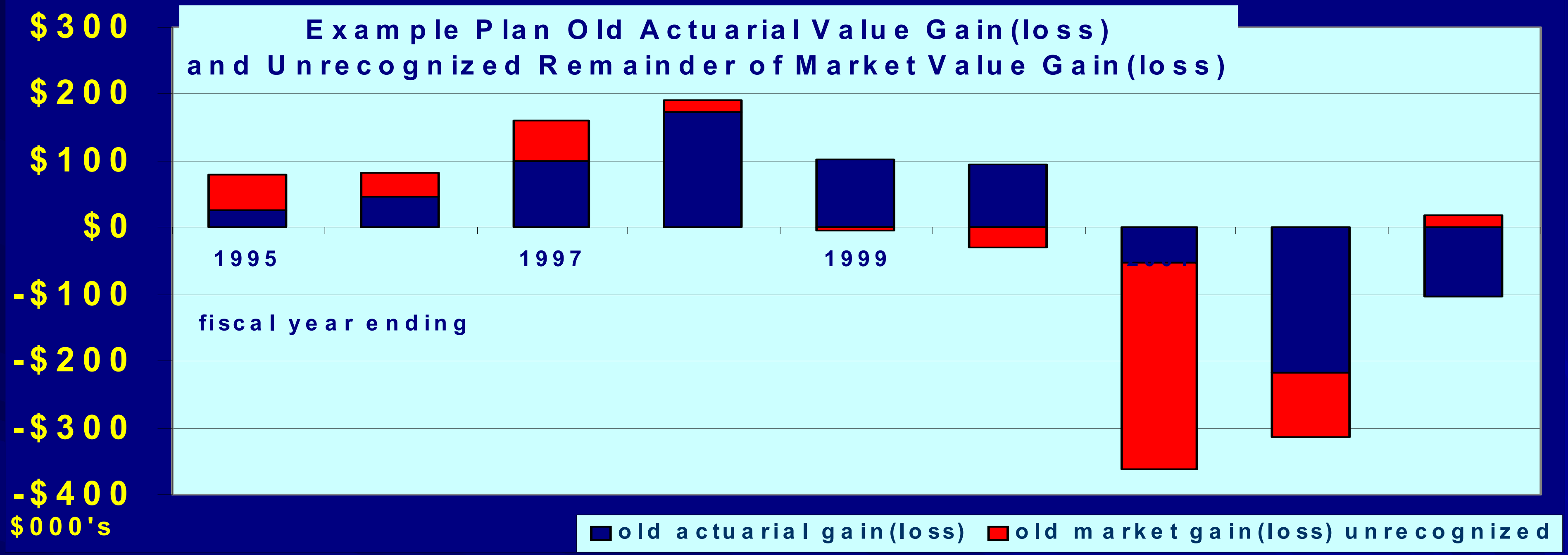
Old Asset Smoothing Method And Amortization Payment

- The Old Asset Smoothing Method **Adjustment** was **1/3** Instead of 1/15
- The Old Asset Smoothing Corridor was **90%-110%** Instead Of 80%-120%
- The **Old Method** had a Larger "Adjustment," and a Tighter Corridor, So it **Recognized Market Gains and Losses Faster** than the New Method

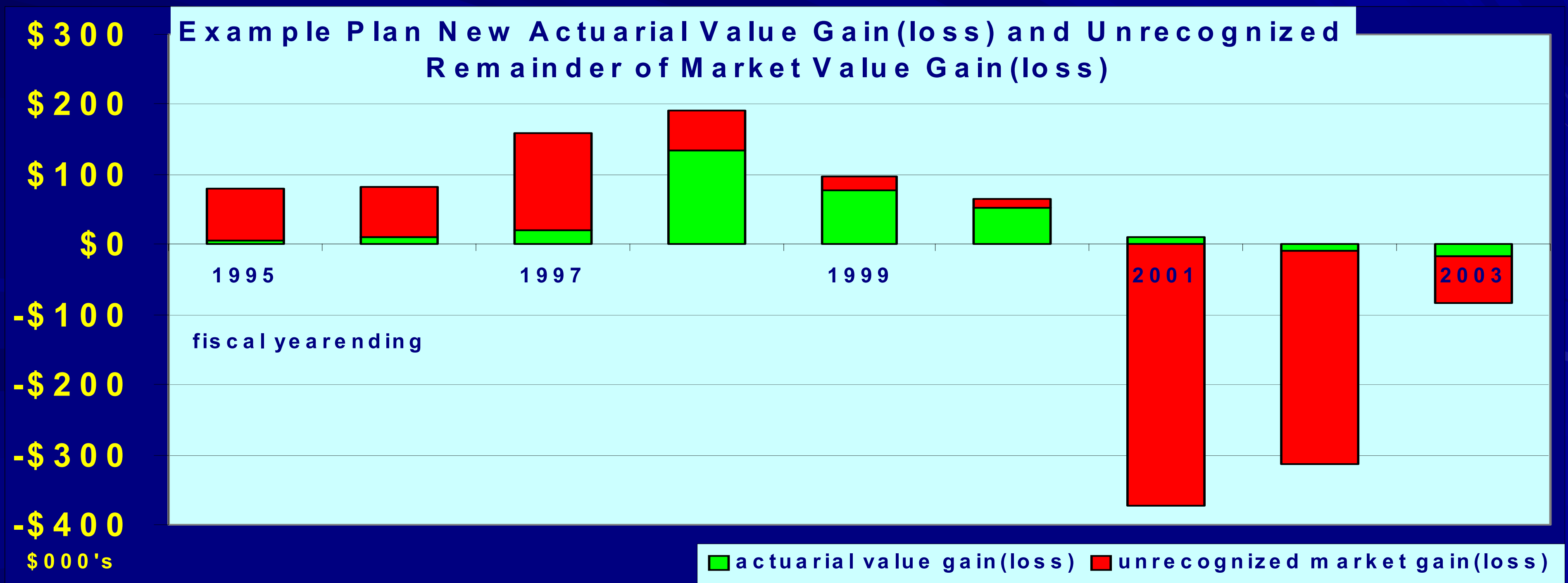


Example Plan Comparison of Ratio to Market, Old and New Actuarial Value of Assets
120%
110%
100%
90%
80%
70%
95%
93%
90%
90%
91%
92%
105%
110%
109%
94%
89%
81%
80%
80%
80%
93%
107%
110%
1998
2000
2002
2004
2006
fiscal year ending
new actuarial AVA/MVA ratio
old actuarial AVA/MVA ratio


Example Plan Old Actuarial Value Gain(loss)
and Unrecognized Remainder of Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
1995
1997
1999
fiscal year ending
old actuarial gain(loss)
old market gain(loss) unrecognized



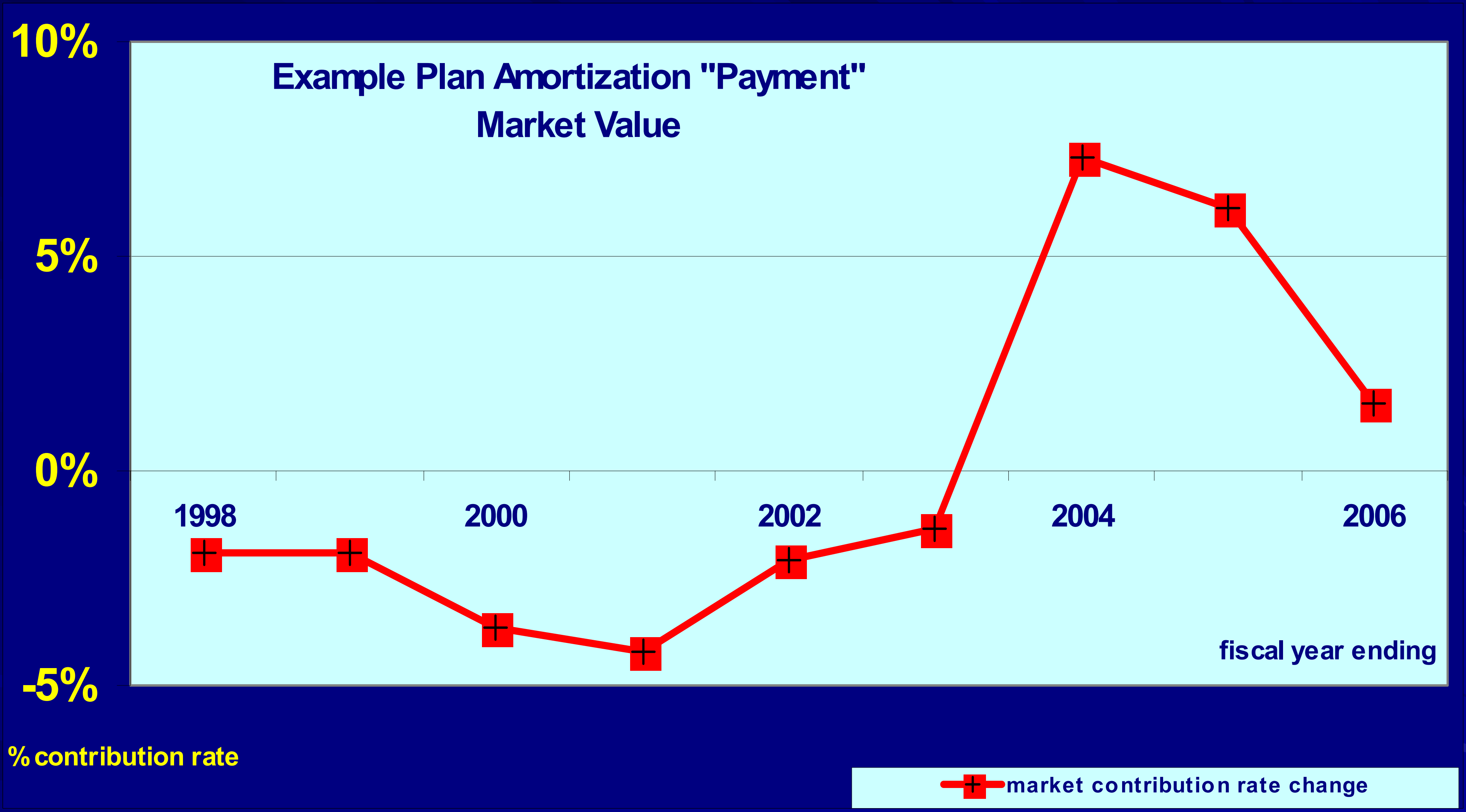
Example Plan Old Actuarial Value Gain(loss)
and Unrecognized Remainder of Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
1995
1997
1999
fiscal year ending
old actuarial gain(loss)
old market gain(loss) unrecognized

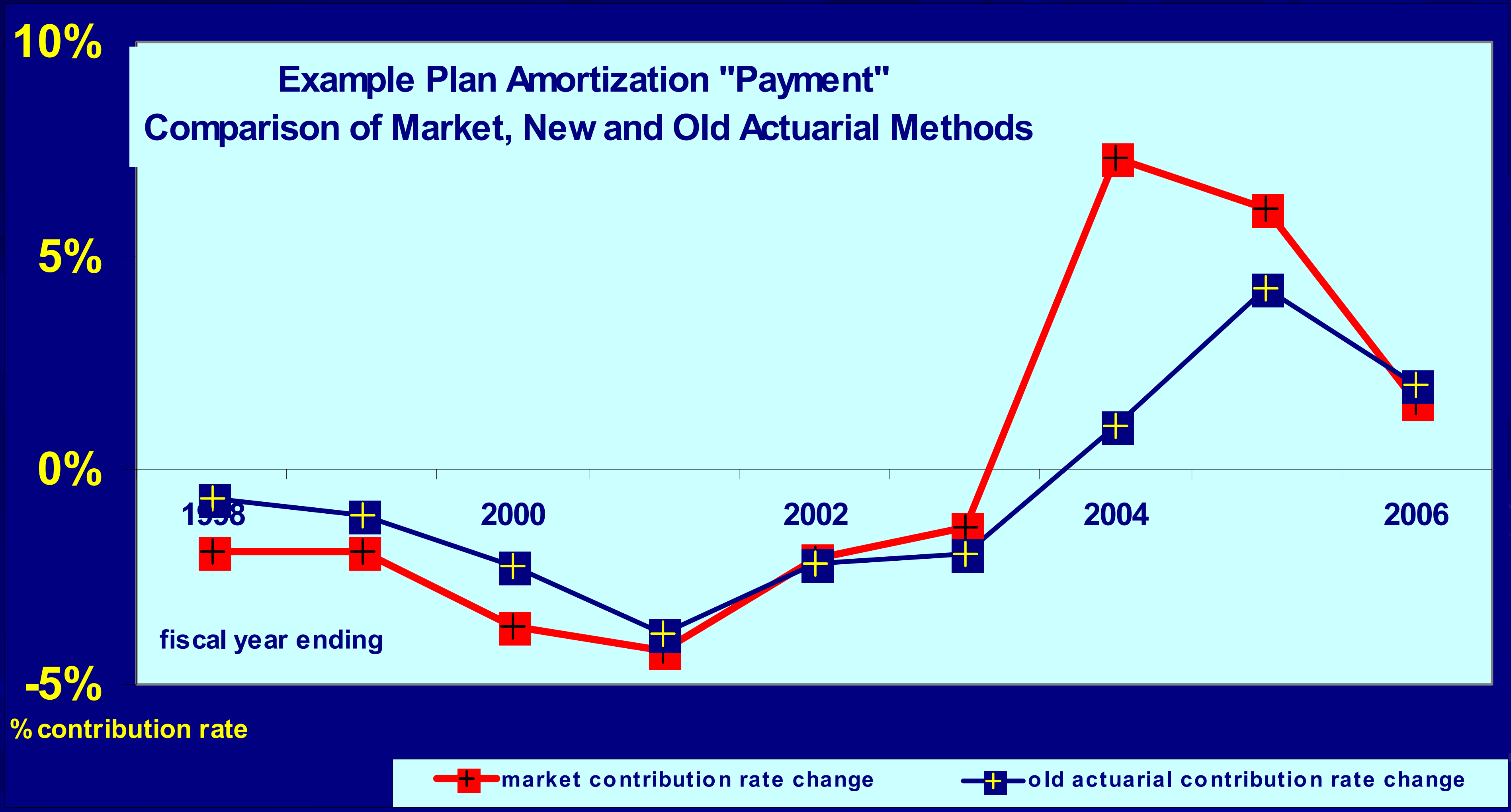


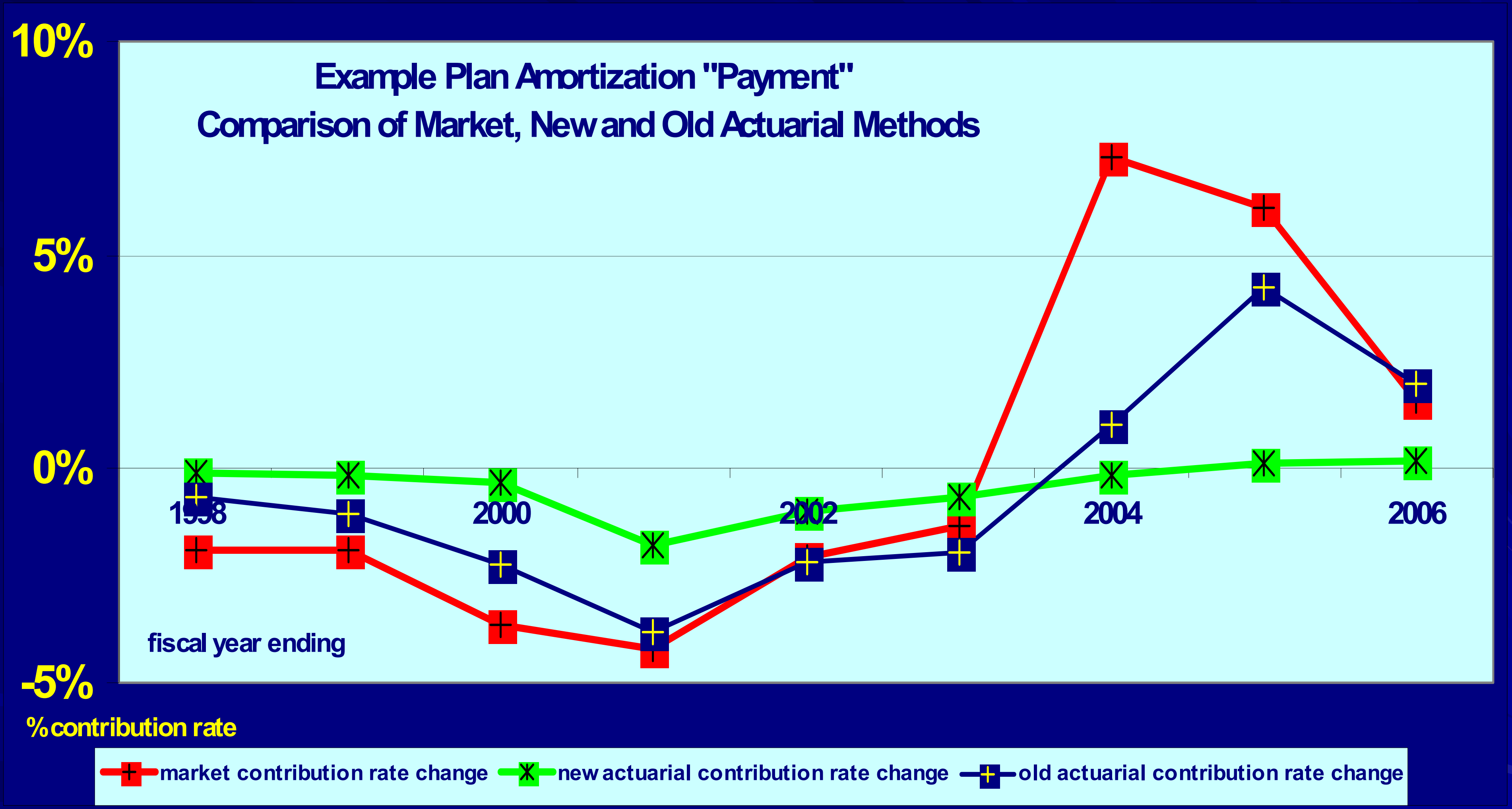
Example Plan New Actuarial Value Gain(loss) and Unrecognized
Remainder of Market Value Gain(loss)
$300
$200
$100
$0
-$100
-$200
-$300
-$400
$000's
1995
1997
1999
2001
2003
fiscal yearending
actuarial value gain(loss)
unrecognized market gain(loss)

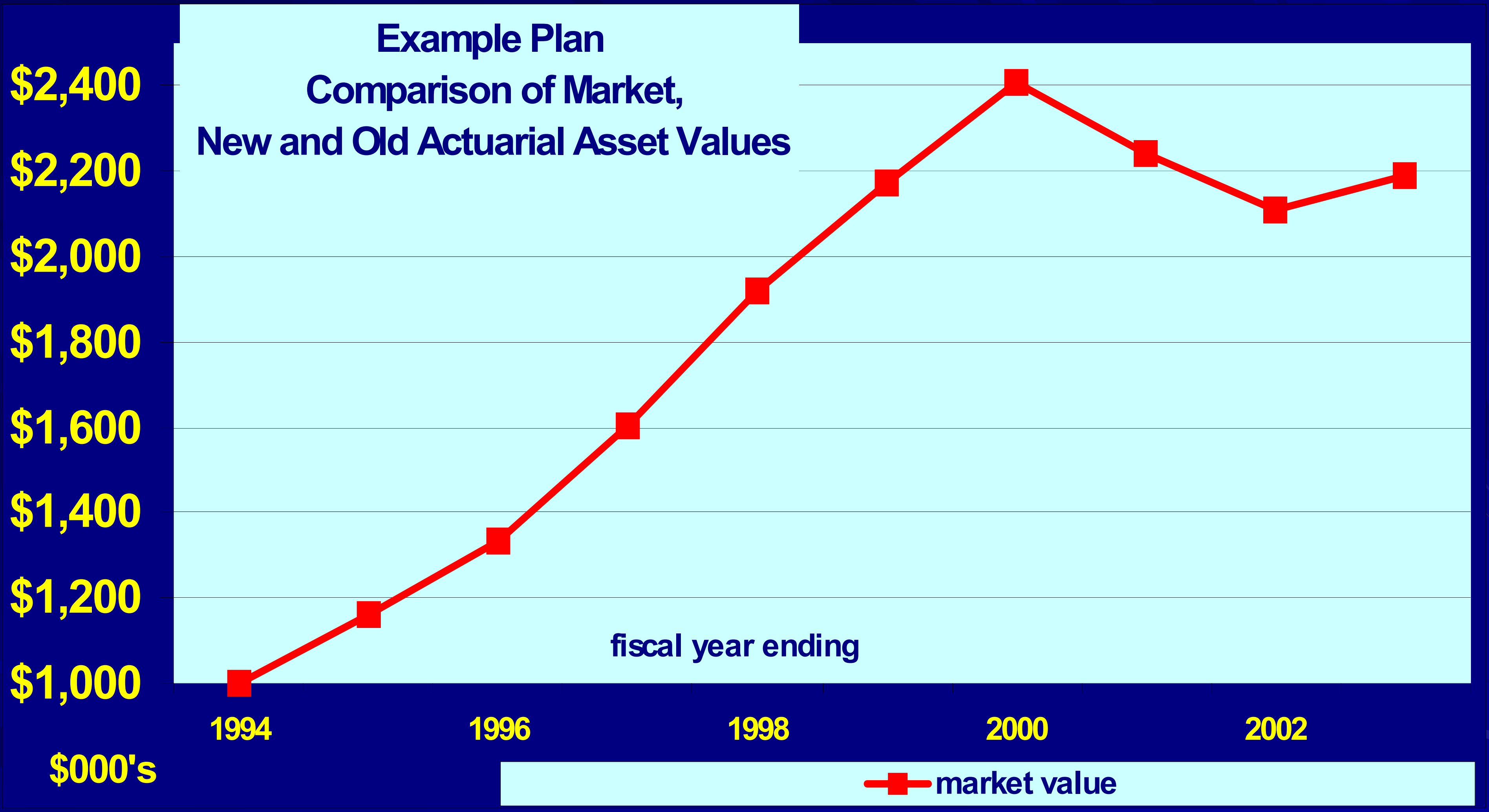
Old Asset Smoothing Method And Amortization Payment

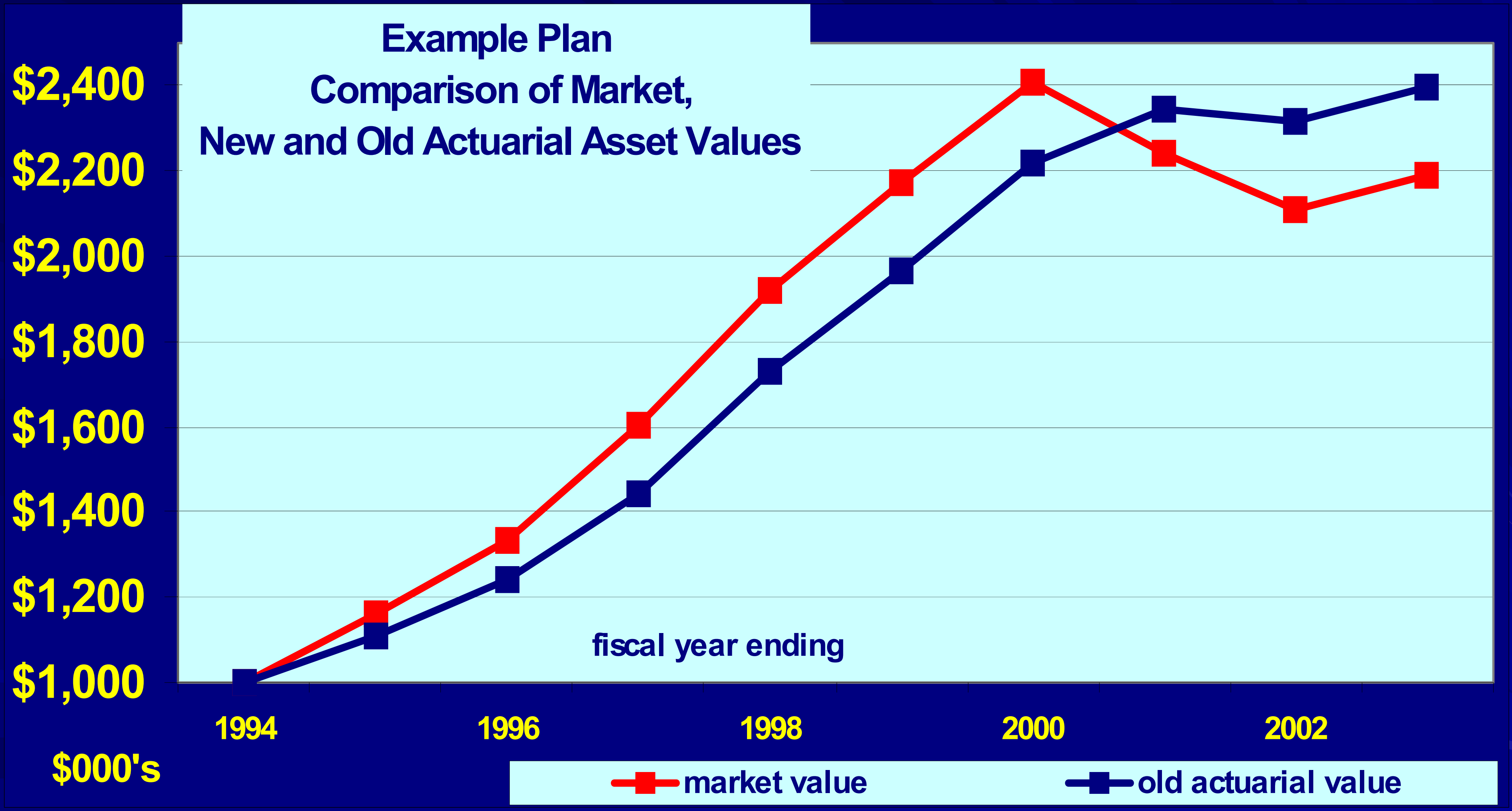
- The Old Amortization Payment was 10% of the Total
- This is the Equivalent of a Rolling 13 Year Amortization Under our Assumptions
- CalPERS Current Policy Amortizes Unfunded Liabilities from Benefit Improvements and Changes in Assumptions Over a Fixed (Not Rolling) Period of 20 Years

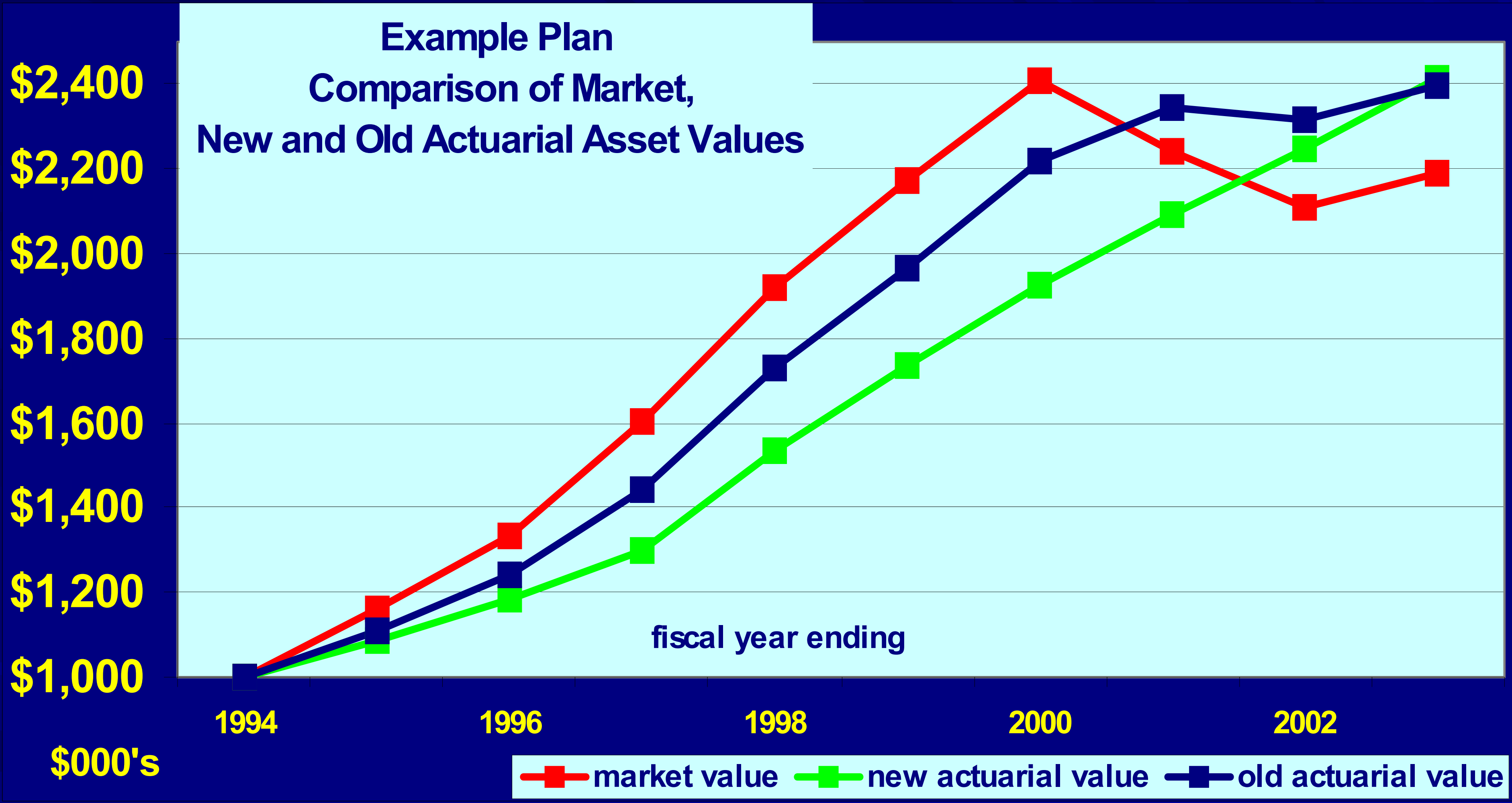

Example Plan Amortization "Payment"
Market Value
10%
5%
0%
-5%
1998
2000
2002
2004
2006
fiscal year ending
% contribution rate
market contribution rate change


Example Plan Amortization "Payment"
Comparison of Market, New and Old Actuarial Methods
10%
5%
0%
-5%
% contribution rate
1998
2000
2002
2004
2006
fiscal year ending
market contribution rate change
old actuarial contribution rate change


Example Plan Amortization "Payment"
Comparison of Market, New and Old Actuarial Methods
10%
5%
0%
-5%
% contribution rate
1998
2000
2002
2004
2006
fiscal year ending
market contribution rate change
new actuarial contribution rate change
old actuarial contribution rate change


Example Plan
Comparison of Market,
New and Old Actuarial Asset Values
$2,400
$2,200
$2,000
$1,800
$1,600
$1,400
$1,200
$1,000
fiscal year ending
1994
1996
1998
2000
2002
$000's
market value


Example Plan
Comparison of Market,
New and Old Actuarial Asset Values
$2,400
$2,200
$2,000
$1,800
$1,600
$1,400
$1,200
$1,000
fiscal year ending
1994
1996
1998
2000
2002
$000's
market value
old actuarial value



Example Plan
Comparison of Market,
New and Old Actuarial Asset Values
$2,400
$2,200
$2,000
$1,800
$1,600
$1,400
$1,200
$1,000
fiscal year ending
1994
1996
1998
2000
2002
$000's
market value
new actuarial value
old actuarial value

Comparison Of New And Old Asset Smoothing Methods

- New Actuarial Value Recognizes Market Gain(Loss) Slower, 1/15 Instead of 1/3
- New Method Allows More Gain(Loss) to Accumulate as "Unrecognized" in 80%-120% Corridor
- New Method Amortizes "Recognized" Gain(Loss) Slower, 6% of Total Compared to 10%

Comparison Of New And Old Asset Smoothing Methods

- New Method is Acceptable Since Market Gains and Losses Tend to Offset Each Other Over 10-15 Year Periods, and
- New Method was Tested to Make Sure it Will Not Jeopardize the Actuarial Soundness of the System

Testing Of New Smoothing Method

- Asset Smoothing and Funded Status Work Against One Another, the More You Smooth Assets, the Slower the Funded Status Moves Back to 100%
- Some Asset Smoothing Methods are So Risky that they Produce a Chance of Fund Insolvency

The Board's Objective Was To Seek The Smoothing Method That "Best"

- Minimizes Rate Volatility
- Minimizes Impact On Funded Status, and
- Minimizes Average Future Contributions
- In Addition, the Board Sought to Find a Method that would Satisfy GASB 27

The Chief Actuary And CalPERS' Actuarial Staff Studied Over 30 Different Smoothing Methods

- Prepared 1,500 50-yr Projections of Contributions and Funded Status for Each Method
- Incorporating Statistical Distribution of Asset Volatility
- Eliminated Methods that Produced Any Scenario of Fund Insolvency During the 50 Years
- Eliminated Methods that Did Not Reduce Volatility by at Least 50%
- Ultimately Eliminated Methods that Did Not Comply with GASB 27

Method	Standard Deviation of Annual Change in Rate	Reduction in Volatility	Impact on Average Employer Contribution Rate	Produces Rates that Comply with GASB 27
Current Methods	3.3%	N/A	N/A	Yes
Eliminate the AVA Corridor with 10 Year spread of Asset Gain and Loss	1.1%	67% Reduction	Increase by 0.5%	Yes
5 Year Direct Rate Smoothing	1.6%	52% Reduction	Increase by 0.8%	No
10 Year Direct Rate Smoothing	1.1%	67% Reduction	Increase by 1.6%	No
Increase AVA Corridor to 80%-120% with 15 Year spread of Asset Gain and Loss over a Rolling 30 year Period	1.6%	52% Reduction	Increase by 0.2%	Yes

New Minimum Contribution

- The Minimum Contribution Feature of the New Rate Stabilization Policy was Added as a Budgeting Tool for Employers and Satisfies GASB 27
- Applies When Unfunded is a Surplus (Actuarial Assets > Accrued Liability)
- Minimum Contribution is = Normal Cost + 30-yr Amortization
- Previously Could Use Shorter Period (Lower Contribution)
- Still Possible to Have Zero Contribution if Surplus is Large Enough

Example Of New Minimum Contribution

Unfunded (Surplus)	$ (2,000,000)	$ (2,000,000)
	Old Minimum	New Minimum
Normal cost	$ 150,000	$ 150,000
Amt. pmt 15 yr or 30 yr	$ (181,818)	$ (125,000)
Total Employer Contribution	-	25,000
Normal cost	15.00%	15.00%
Amt. pmt on Unfunded	-15.00%	-12.50%
Total Employer Contribution	0.00%	2.50%
payroll	$ 1,000,000	$ 1,000,000

Implementation Of New Rate Stabilization Policy

- Effective for 2006-07* Rate
- Gain Loss and Fresh Start Bases Converted from 10% To 6% "Payment" for Non-Pooled Plans Only
- Pooled Plan Side Funds Amortization Schedules Not Affected
- Minimum Contribution Affects Only a Few Plans

* 2005-06 For State And Schools

End Rate Stabilization Section